classification counts where the number of axles for each vehicle is known. These counts are more costly to collect and a factor generated at a single vehicle classification station is used at many PTC stations. The second adjustment performed transforms the daily volume counts to annual average daily traffic (AADT) volumes. This adjusts for seasonal variation typical for a location and provides a consistent measure of traffic regardless of the day of week or month the data was collected. This adjustment is performed using seasonal adjustment factors developed from continuous count monitoring stations operated by the NCDOT.

Continuous volume counts are produced by automatic traffic recorders (ATRs) that have sensors embedded in the pavement. ATRs provide continuous hourly volume counts for each lane of travel at a station. As such, ATRs serve a critical role for explaining the variability observed in traffic counts due to time of day, day of week, and month of year. Data is screened to identify typical travel patterns at each station and stations with common patterns are clustered to generate ATR Groups. Seasonal adjustment factors are generated for these groupings of ATR stations to provide a basis for factoring counts collected at PTC stations. Unfortunately, the cost of installing and maintaining ATRs limit this program to a sampling of stations (100 total) across North Carolina.

Traffic counts produced by the more than 40,000 PTC and the 100 ATR stations must be edited and validated to achieve consistency over time and across space. **Prior to this project, the process required manual and visual comparison of current counts to counts from previous years and neighboring stations. If a count was considered unusual, it was often modified to make it more similar to neighboring counts. This process was very slow, was prone to individual subjectivity and bias, and encouraged excessive manual adjustments to counts.** Improvements to this process can help those performing the editing and validation as well as those using the resulting data.

1.3 Problem Definition

Prior practice within NCDOT for editing and validating count data was to manually and visually calibrate traffic count data from each of the more than 40,000 counting stations with values from neighboring stations. Counts that were not consistent with their neighbors were often manually adjusted to achieve consistency. **Deficiencies of this process include**, but are not limited to, the following.

- There was subjectivity in deciding when a count needs to be manually adjusted.
- If a manual adjustment was needed, there was subjectivity in determining the amount of manual adjustment needed.
- The process encouraged excessive manual adjustments to counts that were not totally in line with their neighbors but were still within the level of variability of the data.
- It took a year to complete the process.
- Because the process was so slow, the window of opportunity for performing recounts of questionable data was often missed, so *ad hoc* manual adjustments were made.
- The process did not realize the recommendations from FHWA and AASHTO to incorporate spatial analysis.

The problem, and reason for this research project, was that NCDOT's process of editing and validating count data needed improvement to address the deficiencies listed above.

This report documents our system for objectively improving the editing and validation process for PTC counts in light of spatial patterns. The next subsection reviews related literature. Section 2 of this report is a general overview of research methodology for all tasks, while implementation details for all tasks are